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ABSTRACT

Knowing what different kinds of computer equipment can do is the first step in choosing the computer that is right for you. This digest describes a developmental progression of computer capabilities. First the basic three software programs (word processing, spreadsheets, and database programs) are discussed using examples. Next, an explanation of more advanced uses of the computer is given, including: graphics or drawing, multi-tasking or performing more than one job at a time, and telecommunications and e-mail. Finally, technological applications in education are discussed which include such topics as interactive video, hypertext and hypermedia, virtual reality, on-line multimedia libraries, and distance learning. Suggested resources for parents are included. (MKR)

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Learning About Tasks Computers Can Perform

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Learning About Tasks Computers Can Perform

Patricia A. Brosnan

Imagine a world where everything is computerized. There would be little need for printed materials—newspapers would be read on home computers. There would be little need for currency—personal credit cards would be used everywhere instead of cash. Cellular and fiber-optic technology would make corded telephones obsolete. Beepers would have both telephone and television capabilities. Cars would be equipped with computerized road maps that would plot courses to avoid up-to-the-minute construction barriers and provide on-screen zoom-in and zoom-out directional features. All bills would be paid, stocks and bonds bought and sold, and travel reservations made directly from home computers.

But we do not have to imagine this world—we are living in it. These and many other technological advances are already available in business, industry, science, and the military. Computerized technology is everywhere—at the market, the gas station, the dentist's office, and even in homes with VCRs, camcorders, microwaves, telephones, alarm systems, and coffeemakers.

Limited budgets dampen the speed at which expensive technology can be acquired in schools. Now, slowly but surely, these advances are appearing in the educational arena. Students are no longer restricted to writing paper-and-pencil essays. They can create multimedia presentations using computers to combine text, graphs, charts, digital images, photographs, slides, real-time video, and sound. No longer do class projects have to be static—they can be dynamic, through the use of technology.

Students today are in the midst of an explosion of academic information that is there for the asking. Through computer technology, students can assume more responsibility for their own learning. They can explore areas of interest and discover more about a topic on their own in a way that seems more fun than a regular class discussion. They are learning to negotiate the information highway as surely as their parents learned to negotiate the interstates.

When traffic is as heavy and moving as fast as it is with computers these days, getting onto that highway can be a bit daunting to say the least. Understanding what your vehicle is capable of and what it is designed to do makes it easier to identify a safe point of entry, headed in the direction you want to go.

Knowing what different kinds of computer equipment can do is the first step in choosing the computer that is right for you. The following discussion describes a developmental progression of computer capabilities. This information may be especially helpful to readers just getting started with computers.

The Basic Three

People purchase computers for a variety of reasons including, but not limited to, looking for a more efficient way of handling routine tasks, keeping up with technological advances, or for business, educational, or personal purposes. Computer users typically learn *word processing*, or computerized typing, first. Certainly at some point, everyone has been through the challenging process of constructing professional or school reports using an old-fashioned typewriter and has felt the frustration of having to re-type whole pages to correct errors in spelling, formatting, or typing. Word processing allows all sorts of routine and non-routine typing without that frustration. Users can rearrange paragraphs and re-word sentences without re-typing the entire document. They can have the computer correct spelling and grammatical errors and suggest better words to use, from an electronic thesaurus.

In schools, teachers who encourage students to use word processing find that their students are willing to do more writing and editing than ever before, and they demonstrate a renewed enthusiasm towards writing. In fact, students are so eager to write on computers, some educators are using word processing to teach reading!

Word processing can be used to produce any of the written documents that would normally be typed or printed—letters, reports, news bulletins, books—but word processing is much more powerful. For example, the user can write a general letter and then personalize it for dozens of different recipients. Typeface can be selected from a variety of styles, sizes, and fonts—and changed at will throughout the document. Words or phrases can be centered, italicized, boldfaced, or underlined. Text can be printed in columns, sideways on a page, or within a boxed area. Tables can be set up, properly sized and spaced, with a few keystrokes. Documents can be strung together electronically with all pages numbered consecutively, and a table of contents can be generated automatically. What fun it is to produce materials that look as though they were printed professionally!

After word processing, the second most popular kind of computer software is a *spreadsheet*, or computerized accounting program. Repetitive computational tasks such as keeping track of a savings or checking account, managing a personal or business budget, or preparing income tax returns can be handled with ease using a spreadsheet. The user enters numbers systematically into a ready-made table—the spreadsheet—and then specifies all sorts of different calculations to be done using the data. The spreadsheet program automatically re-computes results if entries in the table are changed and will produce charts and graphs to assist in data interpretation and forecasting.

The automatic computation feature makes a spreadsheet especially useful in making important financial decisions related to savings, pensions, mortgages, and other long-term investments. By changing the amount of money invested, the rate of return, or the length of time involved, the user can figure out how long it will take to save for college expenses or to buy a home or car, whether it pays to refinance a mortgage, or at what age it is financially feasible to retire. Spreadsheets are also good for exploring other kinds of mathematical relationships, such as population growth, radiation decay, and the spread of infectious diseases, under various assumed conditions.

A third major type of computer software is a *database* program, or electronic filing and sorting system. A database program is designed to organize a large amount of information so it can be easily sorted, searched, and cross-indexed. Suppose, for example, a student retrieves information from the library on the population, area, and form of government for a large number of countries. Using a database, the student can sort the countries alphabetically, by size, or by type of government.

Or, suppose a company has a mailing list of hundreds of people, with the name, address, birthdate, occupation, credit cards, and magazine subscriptions for each of them entered in a database. The company can then send different advertisements targeted to different categories of people, with personalized letters and mailing labels all generated automatically by computer.

Imagine entering an entire file cabinet of information into a database. No longer is there a

need to alphabetize volumes of pages or search through individual folders by hand. The computer can do these tasks in seconds. Some offices have reduced the need for file cabinets by replacing them with a box of disks!

Time for a Break...

After completing a major computing project, it may be time to relax, recover, or rejoice. *Computer games* are not as trivial as one might think. For it can be games that motivate children (and adults) to learn more about computers, while also learning to use the keyboard and mouse, thus enhancing their eye-hand coordination and reasoning skills, all at the same time. Games can also be challenging and fun, of course!

More Advanced Uses

Once the basics of computer tasks are learned, the computer user may become more venturesome and decide to explore more of the ever-increasing power of the computer. Placing designs or pictures in a word-processed document is the next natural step in computer literacy development. To do this, a *graphics* or *drawing* program is needed. These programs are generally designed to allow the user to draw any figure, adjust its size or shape, change its shading or position, and then add text, color, or other drawings. The user can save the completed graphic on a disk, get a print-out, or insert that drawing in another document. The most efficient way to do this is through multi-tasking.

Multi-tasking means performing more than one job at a time. On a computer, users can work with more than one software program at a time and transfer information between programs. Transferring information from one software package to another is just like cutting a picture out of a magazine and pasting it into a report for school. In computing, the same steps are followed electronically—cutting and pasting. Multi-tasking can also be used to print one document while the user is busy working on another one.

As computer users gain confidence and experience, they want to share information with other users. These users may be working on different kinds of computers, using different software, in locations that are many miles apart. Playing telephone tag is frustrating, leaving phone messages is limiting, and visiting someone in person can be too expensive and time consuming. *Telecommunications* capability solves the problem. Most users begin their telecommunications experience through *e-mail*, or electronic mail. This system of communication allows the user to deliver a message of any length instantaneously to another computer user who can then retrieve and respond to the message at any convenient time.

Telecommunication requires a ***modem***, a telephone line, and software that allows the user to access the modem. Adding a modem and telecommunications software to a computer system opens the door to a whole new world of information acquisition. Like a telephone, a modem provides access to places all over the world. The difference is that telephones connect people, modems connect computers. A modem can bring the computerized card catalog of the local library to the home computer screen in a matter of seconds. Through electronic networks such as *Internet*, a modem can provide direct, worldwide access to airline reservation systems, stock market trading, shopping, news and weather broadcasts, and much, much more.

Technological Applications in Education

Some schools are now using a combination of compact disk, computer, and video technology referred to as *interactive video*. Programming allows teachers to enter questions or directions into the video to create an interactive activity that is customized for their students and their curriculum.

Good examples of the kind of advanced software that could eventually make a significant difference in the classroom are *hypertext* and *hypermedia*. These terms refer to an important breakthrough in making computers more compatible with human thinking. Hypermedia provide access to text, graphics, images, and sound on CD-ROMs without requiring users to specify in advance the order of access. Improved graphics, animation, sound, and real-time video can make subjects of study come alive. Students will no longer have to dissect real frogs—they can simulate the dissection on computer. They can experience an earthquake, volcano, or tornado through the use of interactive video; they can conduct chemistry experiments in labs without the fear of harmful chemicals or explosions; and they can explore heretofore unimaginable 4th- and 5th-dimensional mathematics through the power of the computer.

Virtual reality is the latest technology that makes creative use of simulations in computerized video technology. Virtual reality may be likened to surround-sound and surround-video whereby a 3-dimensional environment creates a mental illusion that simulates the realities of physical sensations such as those encountered in flying a plane or driving around a curve.

On-line multimedia libraries provide information for class research projects. Increased access to resource centers all over the world can broaden students' appreciation of different cultures.

Distance learning can take any student to any location to learn any subject—or can bring other people into the classroom from near or far. Experts in any discipline, master teachers, and even community leaders and politicians could become available to inquiring classes. Telecommunications allow students forced to remain at home due to illness or weather to connect with the teacher or school program to make up for lost time. Distance learning can also provide coursework and programs to students in isolated populations who are underserved in certain subjects.

Looking to the Future

With these and many other technological advances occurring simultaneously, it sometimes seems as though keeping up with everything is an impossible task. But, because of the durability and upgrading potential of most computer equipment, obsolescence does not set in as quickly as one might think. It is important, when purchasing equipment and software, to select items that go beyond immediate need to provide room for growth and capabilities for upgrading.

And this is just the beginning! Personal and educational uses of computer technology are limited only by one's imagination. Time is of the essence. Computers are not a fad—they enhance our lives and our efficiency too much to ever disappear. Technological advancement is a dynamic entity and will only continue to grow. *The best way to understand computers is to get busy and use them!*

Suggested Resources for Parents

The following items are only a sample of the hundreds of books, magazines, and videotapes available at computer stores.

Hardware Guides

Computer Shopper: The Computer Magazine for Direct Buyers. (1995). New York: Ziff-Davis Publishing. $4.95/monthly.

Pearson, O. R. (1993). *Consumer Reports Books Personal computer buying guide*. Yonkers, NY: Consumer's Union.

Software Guides

Currid, C. & Company. (1994). *Software: What's hot! What's not!* Rocklin, CA: Prima Publishing. $16.95.

Engst, A. C., Low, C. S., & Simon, M. A. (1994). *Internet starter kit*. New York: Hayden Books. $29.95.

1995 video game buyer's guide. Lombard, IL: Sendai Publishing Group. $5.99.

Videotapes

Learning computer ABCs. New York: Morris Media. $95(!) A 5-tape set on *Learning DOS, Windows, MS Word* and *Excel* is available for $19.95.

MacAcademy: The video training series. Ormond Beach, FL: Florida Marketing International. About $40 per tape.

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